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Wanderwörter in languages of the Americas and Australia

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HIGHLIGHTS

- We examine Wanderwörter in Australia and the Americas.
- Wanderwörter exhibit higher levels of borrowing than most loanwords.
- These items spread in both chain-like and starburst borrowing networks.
- Wanderwörter are often acculturation terms, ritual objects, and technologies.
- Diffusion of cultural or technological innovations plays an important role.

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ABSTRACT

Wanderwörter are a problematic set of words in historical linguistics. They usually make up a small proportion of the total vocabulary of individual languages, and only a minority of loanwords.

They are, however, found frequently in languages from across the world.

There is, to our knowledge, no general synthesis of Wanderwörter patterns, causes of exceptionally high borrowing rates for particular lexical items, or estimates of their frequency across language families. Claims about the causes of their spread exist, but have not been widely tested. Nor, despite researchers' intuitions that Wanderwörter form a distinct type of borrowing, is there a clear demonstration that Wanderwörter are, in fact, different from other loanwords in any concrete way.

In the present paper, we examine the phenomenon of Wanderwörter using a standard sample of vocabulary in languages of Australia, North America and South America. The investigation presented here examines Wanderwörter in great enough detail to answer questions about the linguistic and social processes by which Wanderwörter migrate as well as the shapes and densities of the resulting networks. We show that Wanderwörter can be categorically distinguished from other borrowing.

The study of Wanderwörter to date has focused on agricultural or industrialized societies; however, the phenomenon is well attested in networks of smaller languages. There are areal differences in types of Wanderwörter and the networks through which they spread. Specific categories of cultural association, including but not limited to agricultural cultivation, condition widespread borrowing.

Wanderwörter are outliers in the realm of loanwords, borrowed far more frequently than typical lexical items but still a subset of a more general phenomenon. We show that the link between Wanderwörter and cultural diffusion may be a more sound basis for defining this term than the traditional definitions that invoke the loan frequency, areality, or untraceability of these terms.

1. Introduction

1.1. Overview

Wanderwörter are a problematic set of words in historical linguistics. The category includes loanwords which are widespread, rather than the result of contact between a pair or small group of neighboring languages. They usually make up a small proportion of the total vocabulary of individual languages, and only a minority of loanwords. They are, however, found frequently in languages from across the world. While there is previous research on individual Wanderwörter and linguistic areas, there is, to our knowledge, no general synthesis of Wanderwörter patterns, causes of exceptionally high borrowing rates for particular lexical items, or estimates of their frequency across language families. Defini-

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tions of Wanderwörter vary, and while there are claims about the causes of their spread (such as links to trade), these claims have not been widely tested. Nor, despite researchers' intuitions that Wanderwörter form a distinct type of borrowing, is there a clear demonstration that Wanderwörter are, in fact, different from other loanwords in any concrete way.

In the present paper, we examine the phenomenon of Wanderwörter using a standard sample of vocabulary in languages of Australia, North America and South America, coded for etymological status. This controlled sample provides an unprecedented opportunity to examine the phenomenon of Wanderwörter in a way that permits us to move beyond isolated anecdotes, to clarify why some lexical items become involved in such complexes, while others do not, and to define a threshold for identifying the number of loan events which qualifies a word as being a Wanderwort. The investigation presented here examines Wanderwörter in great enough detail to answer questions about the linguistic and social processes by which Wanderwörter migrate as well as the shapes and densities of the resulting networks. The following issues are addressed:

a. Can Wanderwörter be categorically distinguished from other borrowing?
b. Are there areal differences in the types of Wanderwörter we find evidence for and the networks through which they spread?
c. Do words within certain semantic fields or pragmatic categories become Wanderwörter more readily than others?

1.2. Defining a Wanderwort

The clearest statements about the characteristics of Wanderwörter as a class come from Campbell and Mixco (2007), Hock and Joseph (1996), and Roberge (2010). Campbell and Mixco (2007: 220) define a Wanderwort as follows (numbers and emphasis ours):

1: a borrowed word **diffused** across **numerous languages**,
2: usually with a **wide geographical distribution**;
3: typically it is **impossible to determine the original donor** language from which the loanword in other languages originated.

Clearly the notions of '*numerous* languages' in 1 and a '*wide* geographical distribution' are vague, as is the qualification 'usually' in 2. Criterion 3 is even more problematic. Making the definition of a Wanderwort dependent on the *impossibility* of finding the original source is unworkable. One can say that the original source has not been found, or is not certain, but in many cases if more data are considered or more interpretations explored, then plausible hypotheses about the original source can be proposed. Further, if an original source is evident and the Wanderwort set meets the other criteria, it is odd to exclude it from the category. For example, words like 'coffee' and 'tea' would be excluded from category of Wanderwörter under criterion 3, even though they fit criteria 1 and 2.

In another of the few treatments of Wanderwörter in the basic texts, Hock and Joseph (1996: 254) translate the term as "migrating words" and define these as words that "spread over vast territories through a chain of borrowings". That is, to the basic definition outlined by Campbell and Mixco (2007) they add the notion of a 'chain' of borrowing, implying that Wanderwörter (typically) move in one direction from source to target with this move being repeated as the original target becomes a source for further borrowing. This is one way in which one might want to distinguish Wanderwörter borrowing from ordinary borrowing, which typically occurs between a single pair of languages (Haspelmath and Tadmor, 2009; Bowern et al., 2011). This requirement that Wanderwörter exhibit chain borrowing is in contrast with Campbell and Mixco's requirement that the loans be 'widespread', which is not specific about the trajectory of borrowing. To our knowledge a systematic study of borrowing network shapes has not been undertaken, and it is thus unclear whether trajectory of borrowing is a significant criterion for distinguishing loan type (or is simply epiphenomenal).

Roberge's (2010: 411) definition (following Polomé, 1992 and others) includes "a special category of loanwords that spread across languages, usually in connection with trade or the adoption of external technological, economic, or cultural practices". Roberge thus focuses on Wanderwörter as a special category by virtue of the means by which they spread, and the circumstances of their adoption, rather than the frequency with which they are loaned or other areal associations. Roberge's criteria also imply that Wanderwörter in indigenous languages might be particularly associated with the colonial period, given the widespread changes in cultural practices and economies for those groups.

Conversely, Haspelmath (2009: 45) refers to Wanderwörter as words which "appear in languages from a number of language families in a particular area" (also known as 'areal roots'), and points out that if these are old roots, it may be difficult to establish that they are loanwords. This approach may appear to adopt the perspective of the 'area' or *Sprachbund* rather than the trajectories of individual words. Another interpretation would be that the 'areas' in question may not necessarily be already recognized as exhibiting heavy lexical (or other) diffusion (cf. Nelson-Sathi et al., 2011).

In summary, definitions of Wanderwörter refer to four distinct properties of borrowing. First is the number of loan events, and whether the number of individual borrowing events between languages is systematically greater for Wanderwörter than for other types of words. Secondly is the structure of the loan network. That is, do Wanderwörter show particular patterns in how they are loaned across language communities that make them distinct? Alternatively, such networks could simply reflect the major conduits by which other cultural innovations diffuse across communities. Thirdly is the type of word that is particularly susceptible to becoming a Wanderwort, and whether (and for what reason) certain items or semantic fields are particularly associated with the first two criteria (see also Section 1.4 below). Finally, though we cannot explore this topic here, one might ask whether there are linguistic properties which define Wanderwörter as distinct from other loan categories, either by a tendency to phonological readaptation (or non-adaptation) or the speed of their adoption. The first set of criteria refer to structural properties of the borrowing patterns, and can be used to distinguish Wanderwörter from other types of loans, while the second involves the composition of the class of lexical items that might be defined as Wanderwörter. We discuss the first three properties of potential Wanderwörter in this article; borrowing amounts in Section 2, the shape of the network structures (and potential correlations with other conduits for technology, such as trade networks) in Section 3, and semantic fields in Section 4. Due to data limitations we are unable to address the question of whether putative Wanderwörter have particular phonological characteristics. In Section 5, we discuss the problem of distinguishing Wanderwörter from lexical resemblances that may reflect ancient genetic unity or substratal phenomena. Section 6 provides a brief summary of the paper.

We show that there is, indeed, a category of widespread loans which can be distinguished from other loans by virtue of the

number of times they have been borrowed. We find some limited support for the 'chain' idea, though we note that this is somewhat epiphenomenal. We also find limited support for the idea that Wanderwörter are associated with particular semantic fields, with the exception of acculturation terms, which consistently stand out in our survey.

1.3. Hypotheses about Wanderwörter spread

The diffusion of innovations has been a major focus in communication theory and sociology since the work of Rogers (1962); cultural diffusion has likewise been important as a focus in some schools of anthropology (e.g. Kroeber, 1940), with various theories proposed to explain the rate of uptake of different kinds of innovations in different groups. Investigation of the spread of associated terminology has not generally been linked to these fields of study. Linguists have mainly approached the issue from the angle of etymology, with the exception of 'acculturation', in which a powerful group has invaded, controlled or exerted major influence on another group with a distinct culture (cf. Brown, 1999). Studies of the linguistic effects of such profound cultural influence often include reference to Wanderwörter (for instance Brown, 1999) as well as alternative strategies for naming novel items, such as the coining of neologisms or the semantic extension of indigenous terms to new meanings (Basso, 1967; Campbell and Grondona, 2012).

Previous literature has identified both potential triggers for Wanderwörter diffusion and semantic fields that seem to be particularly associated with them. One of the most common categories of claimed Wanderwörter consists of words referring to material culture items. Diffusion can occur through physical movement of these items through trade, learning of techniques for making items, or copying of styles by people in a sequence of societies. Often these processes occur in combination, providing a motivation for both the trigger of spread and the associated linguistic semantic field.

Domesticated plants and animals are also among the most commonly cited examples of Wanderwörter in Eurasia and Africa. Some of them are thought to have diffused between proto-languages at dates coinciding with the earliest agriculture (thus linking flora/fauna to technical innovation). This may be the case with proto-Indo-European *bhars 'barley', (related to proto-Semitic *burr-/barr- 'threshed grain' (Gamkrelidze and Ivanov, 1995: 836; Mallory and Adams, 1997: 51-2)). However, as with other etymologies at such a time-depth, this is debated. Other cultivars arrived in Europe later, after first cultivation in Asia around 3500 years ago; this trend is exemplified by the term 'rice' and many related forms in the Middle East deriving from Proto-Central South Dravidian *vari (itself perhaps borrowed from another language family, cf. Pejros, 1997: 97). Similar etymological patterns can also be associated with a diffusion of a new variety and/or function, as with the Wanderwort %kannabis[1] 'hemp' in Europe. The word was first associated with a narcotic variety which spread around 3000 years ago from the East, but later named varieties used only for textiles and rope (Barber, 1991; Sapir, 1916; McConvell and Smith, 2003).[2]

Ritual objects and decorations are other items which have a pattern of following paths of cultural influence and trade routes and are candidates for widespread loans. For example, below in Section 3.4 we discuss pearlshell, which is clearly a valued trade item in Australia, and which moves far outside its origin area on the coast into other regions where it is not naturally found. The existence of extensive trade routes for such items has been studied using historical and archeological evidence (McCarthy, 1939; Berndt and Berndt, 1964: 128-9; Akerman and Stanton, 1994) but not linguistic evidence to any extent. Like ritual or decorative items, substances with medicinal or psychotropic properties are also traded and passed from the areas where they grow to other areas. In the Americas, psychotropic substances are highly valued and traded, and in many cases have been obtained from specific source areas and subsequently grown locally. Due to the relationship between religion/ritual and healing, as well as the ritual use of psychotropic substances, novel cultural use might lead both ritual items and psychotropic substances be associated with widespread diffusion of lexical items, which would therefore make them good candidates for Wanderwörter.

Other hypotheses about Wanderwörter spread relate to the demographics of the donor and recipient populations. Such hypotheses (such as the greater likelihood of spread of words from larger populations to smaller ones) apply to general loan events too, but may be particularly pronounced in the case of Wanderwörter, where the number of borrowing events makes demographic correlations easier to recover. Such correlations between population and direction of borrowing could plausibly be related to the greater number of ties which speakers of larger languages may have and/or the relative political power and prestige of larger languages, which can foster borrowing by raising both the appeal and the accessibility (e.g. via lingua franca effects) of the larger language relative to others. Geographical parameters may also affect the direction of diffusion, such as from coastal languages into inland languages or vice versa, as these parameters may shape the pathways by which physical resources move (see further Section 3.4). It may also be that long-distance Wanderwörter are less likely to show these effects statistically, since they cross languages with many distinct demographic and geographical profiles.

1.4. Hypotheses about types of words that become Wanderwörter

One of the reasons that Wanderwörter as a category are difficult to pin down is that there may be several reasons why a root appears to be widespread in an area. In cases where loans may be old, it is often difficult to distinguish Wanderwörter from items that are widespread for other reasons, such as substratal relics of an earlier language, universal sound symbolic properties, or even inheritance from a common (ancient) proto-language. For instance, some of those who support the idea of a Nostratic macrofamily regard some etyma which are shared between Indo-European and these other families as belonging to 'proto-Nostratic', such as *woyn- 'wine' in proto-Indo-European and *wayn in proto-Semitic. However even some of those who support the Nostratic hypothesis regard such items as Wanderwörter, moving with the diffusion of wine and wine-making, for both linguistic and non-linguistic reasons (Dolgopolsky, 1998; Appleyard, 1999; cf. also Sherratt, 1995).

[1] We mark Wanderwort etyma sets with a % sign to denote that the word is not a reconstruction, but rather a generalization across forms that have histories both of adaptation through loanhood and regular sound change, and that are often not reconstructible to a single form because of their complex history. An example from North America is %palata "acorn woodpecker", which represents the likely source of attested forms like Northern Sierra Miwok *palat:ata*, Yowlumne *palakak*, and Tübatulabal *ta:la'gakt*. In some cases, we can be fairly sure of the shape of the source item, as with the words for 'datura', where the source language is known with some confidence, or for 'pelican' or 'wildcat' where the items have been reconstructed for a protolanguage that is either the donor language or the parent of the donor language.

[2] Recent studies of dispersal of cultivars have tended to be interdisciplinary, involving archeology and paleobotany together with linguistics, making it possible to plot the paths of dispersal of the plants along with the words used to name them, as in studies of banana species in south-east Asia and the Pacific (Denham and Donohue, 2009), which then arrived and diffused in Africa (Blench, 2009).

Without the requirement of chain borrowing or network characteristics, adoption of substratal terms may be difficult to distinguish from radially dispersed Wanderwörter, particularly if Wanderwörter are defined by their occurrence in a number of languages across a broad geographic region. Prior etymological analysis can permit us to sort out the most likely cases of long-distance borrowing from cases that may involve widespread sound symbolism or nursery formations, and from other cases which may resemble Wanderwörter distributions, such as substratal adoption due to language shift (McConvell, 2009, 2011).

1.5. Languages and data

Our sample includes 53 languages of northwestern Australia, 55 North American languages from California and the Great Basin, and 27 languages of the Amazon basin in northwestern South America.[3] All of the Australian languages and the majority of the American languages are associated with hunter-gatherer societies. In the North American and South American samples some languages of cultivators are included (this is especially true for South America, where most groups rely on some combination of these subsistence patterns). The Australian sample includes both Pama–Nyungan and non-Pama–Nyungan languages in 11 different genetic groups. The North American sample includes languages from four unrelated families, and six isolates. Eight families and two isolates are included in the South American sample. Fig. 1 gives a map of language locations.

This language sample differs from those in most treatments of Wanderwörter, which typically include languages of metropolitan or agricultural communities, affected by large-scale or global flows of ideas and innovations and associated with the diffusion of major world religions, empires, trade, new crops and technologies (Haspelmath and Tadmor, 2009). Here we focus on small-scale foraging (or partially foraging) communities. While many of these are now part of global networks of ideas and technologies to some extent, many of the Wanderwörter we consider here do not relate to modern cultural contacts, but to contact unrelated to colonization or absorption into global trade networks.

For each language, we collected a standard sample of 204 words of basic vocabulary, along with approximately 120 words (the number varies slightly among the three samples) for flora and fauna, and approximately 100 cultural vocabulary items for each area. The basic vocabulary sample includes forms with relatively culture-free references, such as body parts and words for natural phenomena such as 'water' and 'sky' (see Bowern et al., 2011). The ethnobiological sample (Bowern et al., 2014) includes words that are unlikely to have a special cultural load (such as 'small bird'), but also words for plants and animals of heightened cultural significance (e.g. 'eagle', of ritual and mythological significance in many parts of the Americas and Australia). The cultural sample includes items of indigenous culture (e.g. 'spearthrower', 'arrow') as well as items introduced since the time of European colonization of each of the study areas (e.g. 'gun', 'horse'). For each language, all items are coded for etymological status and assigned to cognate classes. Loan-family sets, as noted in footnote 1 above, are marked with %.

[3] While the South American sample focused on these 27 languages, we also considered information from 76 additional languages (most also from the northwest Amazon), representing thirteen additional language families and fourteen isolates. As with the 27 focal languages, data from these languages were systematically collected for the full word list under consideration. This comparison provided important information about the distribution and history of Wanderwörter in the region. Where relevant, data from these additional languages are included in the South American examples below.

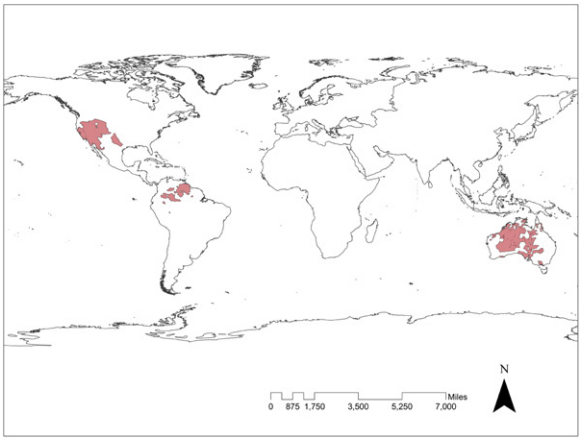

Fig. 1. Case study areas.

The composition of this three-part word list creates a sample with a variety of borrowing levels, ranging from little-loaned words like pronouns to highly borrowed acculturation terms. This approximates the overall range of borrowing levels in the sample languages without explicit manipulation of the word list to achieve a particular distribution of loan frequencies. Items were assigned to etyma sets according to the tools of the Comparative Method. All items which stem in some way from the same etymon are grouped together. However, for the purposes of establishing Wanderwörter counts, only items which are demonstrably loans are included in counts. The older the putative Wanderwort, the more different the forms are from each other and the harder it is to be confident in distinguishing ancient loans from chance resemblances. We have not included forms where the resemblances involve only CV, in order to reduce the likelihood of unwittingly including chance resemblances. We have also been conservative in requiring a high degree of semantic resemblance, or a solid justification in the ethnographic record for a semantic change where this is involved, as in the case of 'moon' ∼ 'datura' in Section 4.3.

2. Assessing Wanderwörter as a distinct category of loanwords

As discussed in Section 1, conventional definitions of Wanderwörter do not adequately establish a categorical difference between Wanderwörter and other loans. Heuristic approaches to identifying Wanderwörter, such as arbitrary threshold numbers of loan events or network links, are useful for detecting likely loan chains but tend to be sensitive to the specific configuration of the loan network. Without an explicit definition or heuristic system by which to classify items as Wanderwörter, it is difficult to assess the notion that this phenomenon represents a different type of borrowing from multiple individual lexical exchanges between pairs of languages. We begin to chip away at this task by examining the hypothesis that Wanderwörter comprise a category of loans separate from typical borrowing with regard to levels of borrowing. While not all highly loaned items are necessarily Wanderwörter (under some definition), quantification of loan events allows us to explore loan frequency patterns and the distribution of different meanings and pragmatic categories along those loan frequency clines. This allows us to compare our notions of Wanderwörter with empirical facts.

In previous work (Bowern et al., 2011), we established that languages in our sample for the most part borrow little from their neighbors, with the vast majority exhibiting borrowing levels in basic vocabulary of under ten percent. The South American area in particular exhibits very low borrowing levels. A small number of languages in the North American and Australian samples are outliers, with levels of borrowing in basic vocabulary ranging

between 20% and 50%. Borrowing levels in the flora–fauna sample are on average higher, averaging 9.8% (Bowern et al., 2014). Material culture loan figures, however, are considerably higher, with an average of over 20% across case study areas.[4]

To test the notion that Wanderwörter form a separate class of borrowing, we use statistical methods. We apply the X-means statistical clustering algorithm (Pelleg and Moore, 2000) to this data to partition it into a well-fitting number of discrete categories. This extension of *K*-means clustering (MacQueen, 1967) groups data points into clusters, inferring the number of clusters by selecting a model that minimizes both the within-cluster sum of squares error and the complexity of the model (assessed using the corrected Akaike Information Criteria (Cavanaugh, 1997)). This procedure strikes a balance between penalizing the creation of excessive numbers of partitions and finding a solution with tightly clustered categories and very little within-group variation. By identifying the location of natural breaks between categories in this way, we provide some statistical evidence for the categorization of lexical data into different loan classes. If Wanderwörter are in fact a distinct loan class, we should find a cluster of high-loan items within our sample. Clustering solutions with large numbers of inferred partitions and those whose partition boundaries do not represent a clear division between highly loaned and less-highly loaned items would not provide evidence for the unique status of a class of Wanderwörter. We first partition the data on statistical grounds, and then look for patterns within the data which might explain why a given set of words cluster together. We do this by temporarily setting aside questions about semantic field and loan network structures, and concentrate purely on the number of loan events that each lexical item undergoes.

2.1. Borrowing levels in the full lexical sample

At the most basic level, then, the status of Wanderwörter as distinct from other loans depends on whether some words are borrowed more frequently than other words. While variation in the 'borrowability' of lexical items is a well-known and empirically substantiated concept (Haspelmath and Tadmor, 2009), the distribution of lexical items across the range of borrowing levels has received little systematic study. A simple bar plot (Fig. 2) shows the number of meanings in our total sample at each attested level of borrowing. As we might expect, the distribution is skewed, with the majority of items borrowed minimally or not at all. However, with increasing borrowing levels we find a smooth curve, and a long tail that stretches into very high numbers of loans.[5] The highest number of loan events in our sample for a given meaning category[6] is 45. Note that this measurement oversimplifies in a number of ways, for example by not distinguishing etyma borrowed several times from 'meaning categories' borrowed multiple times, but potentially independently. We further refine this distinction in Section 2.2 but here treat the measurement as one which shows which meanings are particularly associated with high numbers of borrowing events, whether dependent or independent.

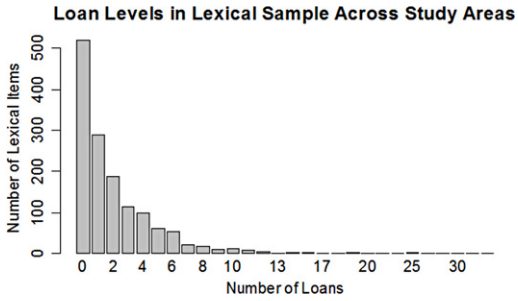

Fig. 2. Loans by meaning category across case study areas.

Although this unimodal distribution does not show evidence for discrete classes of loans in the form of multiple distributional peaks, the curve itself suggests that only a small number of words are very highly loaned, while the vast majority of words do not participate in widespread borrowing.

X-means clustering partitions this data into three categories. The first includes words borrowed up to three times ($n = 1110$); another includes items borrowed four to 14 times ($n = 299$); the third category includes items borrowed 15–45 times ($n = 23$). While within-cluster variance and model AICc point to a three-category solution rather than a binary division between highly loaned items and 'regular' borrowing, the bulk of the data fall into just the first two of these three classes.

As seen from the full list of data in the supplementary materials (see Appendix A), the division between the low- and moderate-borrowing categories does not align precisely with clear semantic or pragmatic categories. However, several generalizations can be made about these categories and the items that fall in them. First, the majority of basic vocabulary falls into the low-borrowing category.[7] Secondly, the extremely high-borrowing category is comprised almost entirely of acculturation terms which were introduced with colonial contact. These include items such as 'paper', 'gun', 'corn', and 'cat'. Non-acculturation terms in this third category are the ethnobotanical terms for *Datura wrightii* and 'grass', both from the North American sample area. The overall patterns in this data suggest that acculturation terms, perhaps not surprisingly (cf. Brown, 1999), tend to be very frequently loaned, while a further division between moderately loaned words and infrequently loaned words may exist but is less clearly associated with semantic or pragmatic differences among meanings or specific sociohistorical settings. This suggests that there is, indeed, a category of 'super-borrowings', which are particularly associated with acculturation processes. However, a weakness of this approach is that it does not distinguish general levels of meaning borrowing from borrowing of specific etyma. A further disadvantage is that items that are identified as probable loans, but with unknown direction, are potentially overweighted.[8] We refine this method in the following section.

[4] We note that the set of material culture terms also includes postcolonial acculturation terms, associated with loans having their origin in European languages. However, loans in this domain are not confined to acculturation terms, and not all acculturation terms are loaned.

[5] Loan counts in Fig. 2 include the total number of forms for a particular meaning that are coded as loans, loans into protolanguage, or loans in an unknown direction, summed across all three study areas.

[6] A 'meaning category' is a translation equivalent. That is, the meaning category 'horse' includes all words, regardless of etymology, which can be used as translation equivalents for the word 'horse'.

[7] The supplementary information gives further details about the types of items in each category (see Appendix A).

[8] In our dataset, 961 words (out of 55,378 total data points) are described as probable loans on the basis of their phonology, morphology, and/or distribution. However, the source of the loan is unknown. For example, *pilthi* 'bird' is a word shared only by two adjacent languages with otherwise little vocabulary in common (Malyangapa and Paakintyi in the Australian case study area). This distribution strongly implies that the word is a loan from one language into the other. However, the direction of loanhood is not ascertainable from current data. If, however, loans with this coding are treated as equivalent to loans where the direction is known, they end up overweighted in loan counts because both donor and recipient language are coded as "loan direction unknown".

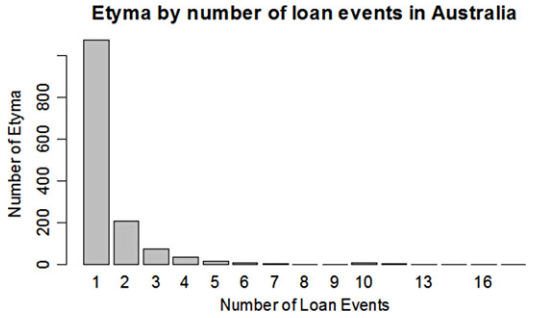

Fig. 3. Loan events in Australia.

2.2. Borrowing levels of individual etyma in Australian languages

To further investigate natural patterns in loanword frequency and the evidence they bring to bear on the nature of Wanderwörter, we look more closely at loans within the Australian case study area and examine them by etyma set. Fig. 2 above plots the number of meanings associated with various levels of overall borrowing across all three study areas. However, it does not take into account the fact that the same 'meaning category' could be associated with loan events of very different etyma. For example, the forms %jirigi and %bandalmada are both associated with the meaning "bird", but because they are separate etyma, the loan events associated with them should be counted separately. While Fig. 2 provides information about the tendency for certain semantic categories to be loaned with varying frequency, the loan counts for form-meaning pairs plotted in Fig. 3 provide a better summary of the etymon loan networks typically associated with Wanderwörter. Focusing on this more detailed information for the Australian study area has the further advantage of allowing the implementation of a weighting scheme to prevent items coded as 'loan direction unknown' from being overcounted.

The overall picture of loan events in Australia resembles the skewed, unimodal curve present for meanings across all three study areas, though the curve is slightly steeper for this case study subset than for the overall data. X-means clustering for this data subset suggests that a two-cluster model best fits the data, rather than the three-category solution proposed for the global dataset. As we found for the global data, however, the break between categories partitions items with three or fewer borrowings from those with four or more borrowings. The lower optimal number of clusters in the classification of Australian loan event data probably reflects the fact that the curve for this study area shows a sharper drop-off as borrowing levels increase, with highly loaned items falling into a flatter tail. In other words, the 'moderately loaned' category in Fig. 2 is inferred because a relatively substantial number of meanings are neither associated with rare borrowing nor with extremely high borrowing. In Fig. 3 we see that the majority of etyma are borrowed a single time, with a dramatic drop in the number of etyma that are borrowed even twice. Etyma borrowed more than three times are distributed relatively evenly among higher borrowing rates, forming a shallow tail in the distribution and preventing a 'moderately loaned' category from emerging.

Again, we find the majority of basic vocabulary items in the low-borrowing category and the majority of cultural terms, and especially postcolonial acculturation terms, in the high-borrowing category. However, the pattern is less distinct near the border between the two categories returned by X-means clustering. The classification of basic words such as 'dust' and 'small' in the category of etyma most frequently borrowed is not easily explained by traditional accounts of Wanderwörter presented above.[9] In all likelihood, the boundary between the number of loan events associated with true Wanderwörter and the level of borrowing that 'ordinary' items typically undergo is a fuzzy one, with individual, unrelated loan events occasionally adding up to numbers that approximate the borrowing levels associated with Wanderwörter. Quantification of borrowing can only tell part of the story regarding Wanderwörter, since high numbers of loan events for a given meaning does not of itself entail the existence of a Wanderwort.

The levels of borrowing exhibited by Australian data and in the global dataset provide mixed evidence regarding the distinction between Wanderwörter and other loans. On the one hand, the distribution of loan frequencies exhibits a continuous cline in loan levels rather than the sort of multimodal peaks that would provide powerful evidence for a categorical distinction between Wanderwörter and 'ordinary' borrowing. However, clustering analysis identifies a statistical division between etyma loaned three times or fewer and those more highly borrowed that may represent a divide between 'ordinary' loans in the head of the distribution and Wanderwörter in the long tail of the distribution. This result is consistent with the conventional wisdom that 'ordinary' loanwords are far more common than Wanderwörter, and suggests that the much greater variation in borrowing levels among the most loaned items reflects the importance of individual words' histories for determining how far and wide a word may wander. It also indicates that while high loan status may be part of the definition of a Wanderwort, it is not the only component worth examining.

3. Patterns in network structure and directionality of borrowing

In this section we discuss the structure of Wanderwörter borrowing chains in more detail. Because of the difficulty in measuring network shapes mathematically with the data available, we concentrate instead on characterizing the general patterns evident in our dataset of high and ultra-high loan items. While graph theory (and particularly components of social network analysis) have a number of tools to measure and compare the structure of graphs such as those produced by putative Wanderwort patterns, our data have too many holes to make such comparisons reliable. We provide some discussion of this in Section 3.2.

Previous work on Wanderwörter has emphasized a chain-like pattern for loans, in which a word is borrowed in sequence and thereby spreads linearly across an area (see Campbell and Mixco, 2007).

(1) A → B → C → D.

However, the mapping of widespread loans in our dataset shows that there are, in fact, several different types of loan pattern. In addition to the chain pattern, a 'radial' or 'star' pattern, where a single language loans a term into several (or all) of its neighbors, is also widespread. This is illustrated in (2), where the notation means that Language A was the donor language for terms into languages B, C, and D.

(2) A → B, C, D.

Combinations of these patterns are also found, where etyma participate both in chains and radial borrowing patterns.

[9] In these particular cases, "dust" is borrowed into Gooniyandi, Gajirrabeng, Gurindji, Kija, Miriwung, and Wunambal, all from Ngumpin–Yapa languages. "Small" is due to a number of loans from Nyulnyulan into surrounding languages. It seems that these loans from members of a family/subgroup into several other languages account for much of this unexpected pattern. We might consider these to be independent borrowing events (of nonetheless cognate items) rather than true Wanderwörter, however there is no principled way to say when this sort of underspecified source can be counted as part of a Wanderwort network and when it is associated with individual loan events.

One pattern that we do not find robustly attested in the dataset is multiple independent borrowings of the same lexical item from discontiguous languages. That is, theoretically it would be possible to achieve Wanderwort status (at least in numerical terms) by a loan structure such as that illustrated in (3) below, where the same etymon has been borrowed independently between pairs of languages. The scarcity of such a pattern in the dataset is not, perhaps, surprising, but it is worth mentioning given that it enforces the way in which Wanderwörter might be different from simple repeat (but adjacent) borrowings of the same lexical item. It further points to the importance of trade or other factors in spreading such loans.[10]

(3) A → B, C → D, E → F
where A, C, and E are closely related but not contiguous languages.

3.1. Long chain networks

We find relatively few long chains in the dataset, characterized by three or more consecutive borrowing events in which a borrowing language serves as the source for a subsequent loan. In North America we find long chains involved in complex borrowing networks, such as in the terms for *datura* and *acorn woodpecker*, discussed below in Sections 4.4 and 4.6, respectively. The items associated with these etyma are traded and used in ritual in this study area, which may explain the number of chain-like links in their borrowing networks as well as the occurrence of parallel chains and star-like branching in those same networks.

Long chains appear to be relatively frequent in the Australian case study area compared to other areas. Study of these long chains is hampered to some extent by the difficult in ascertaining the direction of borrowing, however. For example, in the case of %tyimpila 'speartip', ten languages from five different families along the Fitzroy River (and east into the Victoria River district) share an almost identical form, strongly indicating that it is a recent loan.

The only long chain identified to date in the South American sample involves the etymon %hipa 'coca' (see Section 3.4.3 below), but the scarcity of long chains in this region may be in part due to problems of detection; because common source languages belong to widespread and discontiguous families (such as Arawak and Tupí-Guaraní), multiple borrowings from closely related source languages are not easily distinguished from chains of borrowings.

3.2. Star and short chain networks

Widespread loan words may reflect star-shaped (radial) spreads from all edges of a source language, rather than, or in addition to, the chaining of loan moves described in Hock and Joseph (1996). This star-shaped pattern of borrowing is perhaps the most common configuration of Wanderwörter networks in the North American case study, where languages all around the edges of the source language have borrowed some item. In this case, there is no borrowing chain; each attestation of the form represents a transfer of the etymon from the same source to one of many recipients. A good example is a word for 'dog' in the North American case study region. Here the word appears to be Proto-Miwokan, and has been borrowed into languages that surround the Miwokan family (though probably from several different Miwokan daughters, indicating that the source of the star may be a set of closely related languages rather than a single language).

(4) %haju 'dog'
Miwokan *háju (Lake Miwok *háju*; Bodega Miwok *hajúu$a*, Southern Sierra Miwok (Yosemite dialect) *haju*) > (Kashaya Pomo *háiju* (Oswalt, 1964: 153), Patwin *háiju*, Yokutsan *k^{h}ay'iw 'coyote', Wappo *háju* (Sawyer, 1991: 29)) > Huchnom *haNwúce* (source for Huchnom unclear)

Several of the Wanderwort networks identified in the study include only two chain-type links, though additional radial borrowings may be included in their networks. Again we look to North America for examples of this pattern. A representative sample of meanings and the languages into which they are borrowed is given in (5) below.

(5) a. %pahmo 'tobacco' Yokutsan > Mono > Shoshone ; Yokutsan or Miwokan > Maidu > Washo
b. %mani- 'datura' Gabrielino > Cupan > Serran > Chumashan, Tübatülabal
c. %wits-∼wich-'bird, small bird' Southern Numic > Serran, Southeastern Yokuts > Ineseño
d. %?ui 'roadrunner' Yok–Utian > Nisenan, Western Mono, Tübatülabal, Kawaiisu > Chemehuevi,
e. %hus 'buzzard' Sierra Miwokan > Washo, Wintun, Maiduan, Wintun> Lake Miwok
g. %chipik 'beaver' Yokutsan > Kitanemuk > Kawaiisu; Yokutsan > Chumash
h. %molo- 'black bear' Yokutsan > Kitanemuk, Tübatülabal > Shoshone; Kitanemuk > Kawaiisu
i. %hawuts 'fox' Yokutsan > Western Mono, Ventureño Chumash; Numic > Northern Sierra Miwok > Washo
j. %saka 'black willow' Serran > Nim-Yokuts > Salinan, Sierra Miwok
k. %lima 'brown bear' Pomoan > Wappo > Wintu
l. %hola 'badger' Sierra Miwok > Maidu > Washo
m. %?aq 'eat pinole' Chumashan > Californian > Southern Numic

It is immediately obvious that there is some overlap between the meanings that appear in this list of items and the items with chain-like borrowing patterns more typical of the classical description of Wanderwörter. For example, %pahmo is a word in the tobacco complex that, like the more-widespread %sokon, originates in Yok–Utian and spreads into Uto-Aztecan languages on the one hand and into Maidu and Washo on the other. %mani- 'Datura', like *moji ∼ *moni 'moon, datura', is a word that probably originates in Gabrielino and the Cupan languages, and spreads both within California Uto-Aztecan and into one variety of Chumashan. These cases involve culturally important plants and similar languages to examples associated with longer borrowing chains, and the difference in chain length is probably either accidental or a reflection of imperfect data.

3.3. Supernova patterns

A third type of structure is where most or all languages in a region show a particular word. These are most common in our acculturation vocabulary sample (e.g. 'horse') but also occur in a few other items, such as *Banisteriopsis caapi* (%kapi) in languages of the Upper Rio Negro region of Amazonia. Logically, such distributions could have their origins in several different loan structures. They could be from long chains that have folded back on themselves across a region, for example, or from star-like networks, where loans have radiated into surrounding languages until they have covered all languages in region. Finally, they could spread 'wave-like', where every language in a region rapidly adopts a word. We lack the data to be able to distinguish these scenarios with any reliability at this point.

[10] We note, however, that this pattern probably has occurred in Amazonia, particularly involving the Arawak and Tupi–Guarani language groups, which are widely discontiguous in the Amazon basin but are known to have been influential in maintaining large-scale trading networks (see, e.g. Rydén's 1962 discussion of Tupí-Guaraní terms for 'salt' in Amazonia). However, the pattern is difficult to identify where so many of the relevant daughter languages are currently unattested. The word for 'dog' illustrated in (4) may be another example.

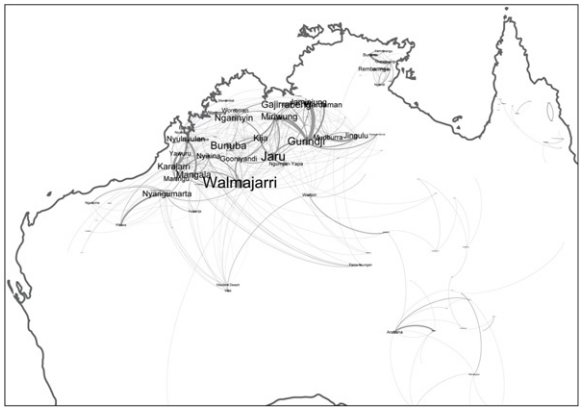

Fig. 4. Major loan patterns: Australian case study area.

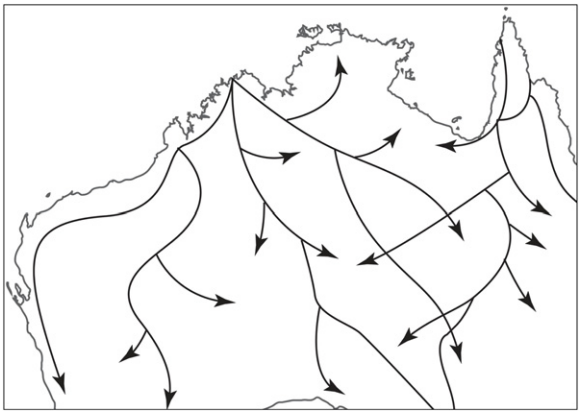

Fig. 5. Pearlshell trade networks (after Akerman and Stanton, 1994).

3.4. Trade networks and Wanderwörter networks: social network analysis

Social network analysis tools allow us to plot Wanderwörter networks according to the number of loans linking individual languages, and to compare these networks to possible correlates of Wanderwort spread. Here, we compare Wanderwörter networks to known trade networks in the Australian and North American case study areas to assess the likelihood that Wanderwörter travel straightforwardly along trade networks. This raises the question of whether all (or most) Wanderwörter spread through trade, or whether alternative sources are possible.

We test this notion by mapping loan patterns geographically, using graph visualization tools typically employed for Social Network Analysis.[11] We present data for Australia and North America. Owing to the high degree of difficulty in establishing pre-contact geographic settlement patterns in our South American case study, we do not attempt to do the same for Amazonia here.

3.4.1. Australian case study area

Fig. 4 shows the major links map for loans in the Australian case study area side by side with a map of the route of pearlshell (after Akerman and Stanton, 1994) in Fig. 5, which proxies widespread trade of other items.[12]

Figs. 4 and 5, which represent the network of loan transmission in our Australian study area and known trade routes in the region, respectively, provide some perspective on the notion that Wanderwörter are correlated with trade or diffuse along trade corridors. The geography of the borrowing network in Fig. 4 bears only limited resemblance to the network of trade routes in Fig. 5, suggesting that while economic trade may contribute to the spread of Wanderwörter, it is not the sole mechanism, or perhaps even the primary mechanism of Wanderwort diffusion. If regional trade networks were the primary conduit for Wanderwörter spread, we should expect a closer match between our network generated from highly borrowed lexical items and that generated from traded items. This conclusion is modified in Section 3.4.2, however, based on further data from California.

In individual cases, however, highly traded items may in fact predispose the linguistic forms used to refer to them to be widely borrowed. For example, whereas aggregate loan networks map poorly onto general trade routes, the specific network along which the term for 'pearlshell' itself has spread is a very plausible route for pearlshell trade. That is, trade itself is not sufficient to establish patterns by which Wanderwörter are spread, but the widespread exchange of an item may lead to loans for its name. This is congruent with the findings in Bowern et al. (2014), which found that trade itself did not predict high loan levels for flora/fauna items, but some of the highest loaned items were nonetheless highly traded. Thus trade is neither necessary nor sufficient for Wanderwort status, at least in this case study area.

3.4.2. North American case study area

Figs. 6 and 7 below provide trade network and loan data which parallel those in the Australian case study area from Figs. 4 and 5.

The loan networks in the North American study area (Fig. 6) more closely resemble known trade networks in the region (adapted here in Figure 7 from Davis, 1961), particularly in the web of contact around the Clear Lake area, and in the centrality of Yokuts to trade networks involving its neighbors. The relatively greater isomorphism between loanword networks and economic trade networks in North America might suggest a stronger association between lexical borrowing and economic trade in this region than in Australia. It is important to note, however, that the structure of these two social networks in the California area may be constrained by physical geography, creating a limited number of possible pathways for both economic and linguistic contact.[13] With the Pacific Ocean and Coastal Range to the west, the imposing Sierra Nevada Mountains on the east, and much travel outside of the Central Valley funneled through rugged river valleys and canyons, the physical location of the Yokuts languages makes their communities likely hubs of contact among neighboring linguistic groups from all sides. In this case, the parallels between trade and Wanderwörter may indicate shared linguistic and economic history, but ultimately this may reflect not a necessary link between trade and linguistic borrowing but rather the more general conditioning of social contact in this region. In contrast, some Australian trade networks may be shaped more by customary partnerships that evolve throughout history than by physical

[11] Here we use Gephi open graph visualization software to map borrowing networks (Bastian et al., 2009).

[12] The path of pearlshell trade is similar to a number of the other major paths for traded goods in the area, though few goods participated in such a widespread network as the pearlshell one. For local trade networks that are congruent with the continent-wide one, see McBryde (1984a,b), for example.

[13] However, McCarthy (1939) quotes contemporary ethnographic sources for Queensland (e.g. Roth) in which trade pathways are likewise strongly constrained, if not strictly by geography then by custom. However, McCarthy also describes the importance of local barter systems, which have a less formal network structure and are less clearly defined than either the regional networks or the continent-wide highways, such as that characterized by the pearlshell network in Fig. 5 above. This may explain at least some of the variation between the Australian and North American areas.

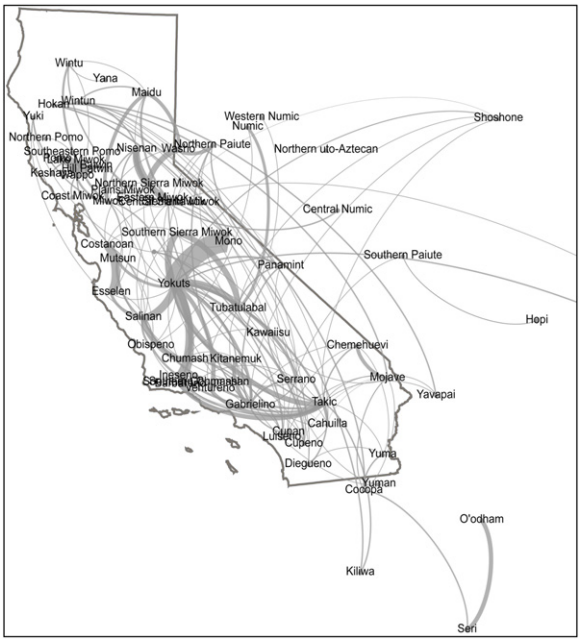

Fig. 6. Loan networks in California.

Fig. 7. California trade networks.

geography (cf. McCarthy, 1939). We might thus expect historical trade and Wanderwörter networks in Australia to be geographically more diffuse and exhibit less obvious spatial parallelism.

While general patterns are useful, it is also worth considering the ways in which particular languages contribute to network structures. That is, the structure of a loan network is not independent of the languages that it comprises. Dominant languages within a region, for example, will tend to produce star-like borrowing patterns, as they loan words to their neighbors. We briefly investigate these patterns for North America. Example (6) shows the number of cases in which a language (or language family in the case of loans of words that reconstruct to protolanguages) has been the source or language of origin of a chain borrowing.

(6) Number of Wanderwörter with short and long chains, by ultimate source language or group
3 links: Yokutsan source: 2
Miwokan source: 3
Chumashan source: 3
Gabrielino source: 1
Patwin (Wintun) source: 1
2 links: Yokutsan Source: 5
Gabrielino source: 1
Southern Numic source: 1
Sierra Miwok source: 2
Serran source: 1
Pomoan source: 1
Chumashan source: 1

Example (6) shows that different source languages dominate in lexical complexes that have three-link chain borrowing, versus lexical complexes that have two-link chain borrowing. Miwokan and Chumashan, thought to be longer established in California, dominate the three-link systems, with Yokutsan, which Golla (2007) suggests is a late intrusion, moving into the southern Central Valley from the Great Basin about 1500 years ago, in second position. This may reflect the greater age of three-link systems. On the other hand, Yokutsan is clearly the most common source in the perhaps more recent two-link borrowing chains, reflecting an important impact of this intrusive language group on its neighbors. Yokutsan, along with Miwokan, is also the most common source in star-shaped borrowing. There appears to be slightly more variety in the source languages for two-link chains.

(7) Directionality of chain borrowing in short and long chains
3 links: West > East: 7
East > West: 0
North > South 1 in 'mountain lion'
South > North 2
2 links: West > East: 9
East > West: 1
South > North: 4
North > South: 0

As example (7) demonstrates, both three-link borrowing chains and two-link borrowing chains exhibit strong, and similar, directional tendencies; most loans in chain borrowing in California go from west to east. Where the dominant directionality is longitudinal, chain borrowings are more likely to go from south to north.

3.4.3. South American case study region

In South America, it is in many cases very difficult to determine the source and pathway of Wanderwörter. This difficulty is a result of various factors; in particular, the prevalence of small language families with few or no attested sisters constrains the comparative assessment of a source, and a lack of data for many languages creates challenges for establishing both sources and pathways. In many cases, we can identify a generalized local distribution of a shared form, but can do little more than guess beyond localized borrowing events. However, we can be reasonably certain that Wanderwort diffusion occurred in chain-like fashion in some cases. At least two links can be identified in chains involving a probable Arawak source ('spider monkey'), a Carib source ('iguana', 'howler monkey'), and a Tupí-Guaraní source (e.g. 'gourd dipper', 'beans'). At least three links are probably involved in the diffusion of terms for 'coca' (*Erythroxylum coca*), which apparently originated with Boran or Witotoan languages and spread to the northwest through Tukanoan, Arawak, Nadahup, and other languages of the region (see example (8) below; compare also the complex spread of terms and meanings associated with the etymon %kumu, as described in Section 4.4 below, which cover roughly the same area).

Where borrowing chains can be identified in the northwest Amazon, loan pathways tend to originate with languages that are located along the larger rivers and move into the upland regions, with regional systems like the Vaupés area as local foci of diffusion. This directionality is probably associated with the role that Arawak and Tupi–Guarani speakers apparently played as brokers of an extensive system of trade routes that followed the rivers (Hornborg and Eriksen, 2011).

4. Cultural categories and the tendency of words to wander

As discussed in Section 1 above, the distinction between Wanderwörter and ordinary borrowing relies in part on an intuition that certain *types* of words are more likely than others to be borrowed widely across neighboring languages. That is, the definition of Wanderwörter is not based on the frequency of borrowing events alone. In this section we review arguments about different cultural categories (or lexical semantic fields) and the evidence within our dataset for items in those categories to be particularly associated with Wanderwörter.

4.1. Cultural items

Hock and Joseph (1996: 242) claim that "words for cultural items or concepts are especially apt to become widely dispersed". In its most basic form, this hypothesis would entail that words for culturally significant items are more likely to become Wanderwörter than are basic vocabulary items. The class of 'cultural items' is itself a very broad category, of course, and the interaction between cultural salience, etymological stability, and novelty of use must be considered in linking cultural significance to the likelihood of widespread diffusion. Whereas cultural centrality is associated in the ethnobiological literature with a resistance to lexical replacement for already-salient items (e.g. Berlin et al., 1973; Hunn and Brown, 2011), the existence of novel items and even novel uses for items creates situations where cultural importance increases the likelihood of borrowing (see further Bowern et al., 2014).

The introduction and spread of new, culturally important items creates a natural opportunity for the spread of words. For example, the etymology of the word 'coffee' outlined by deVaan (2008) coincides with the drink's spread from North Africa to first Turkey, then Italy, and then to other parts of Europe. Such a process was probably behind the spread of etymon %hipa "coca" in the northwest Amazon (example 8).

(8) coca %hipa
Boran (Bora *íípií*, Muinane *xííbi-?o*) <--> Witoto (Ocaina *hiibiro*, Witoto *hibíϵ*) > Andoke (*hí?píe*), Yagua (*xapatij*), W. Tukanoan (Koreguaje *xipie*), N. Arawak (Resigaro *híibí?é*); N. Arawak (Yucuna *ipatu*, Kabiyari *patu*, Tariana *hipatu*, Baniwa *hiipáto*, Kabiyari *pátú*) > E. Tukanoan (e.g. Tukano, Waikhana *pátu*), Carib (Carijona *iihatu*), Nheengatú (*ipadu*) > Nadahup (Dâw *tu?*, Nadëb *bato?*)

In other cases, the introduction of a new cultural use for an existing item can create the condition for a lexical loan. In South America, Balée (2003) argues that the wide distribution of the %kakau "cocoa' etymon resulted from borrowing after the Europeans brought this plant into commercial focus for the indigenous people, who had pre-existing names and uses for this species. Thus, the general expectation that culturally significant items are more likely than basic vocabulary to become Wanderwörter can be refined, where historical information permits, to an expectation that items for which novel uses have been adopted and spread are most likely to become Wanderwörter.

Whereas the partitioning of the lexical data for Australian languages reported in Section 2.2 places only 3.35% of basic vocabulary etyma in the highly loaned category, much higher percentages of flora and fauna terms (7.41%) and of material culture terms (13.71%) are included in the highly loaned cluster. From this general perspective we note a strong tendency for material culture terms to be subject to more widespread borrowing than basic vocabulary terms. To a lesser extent, we find flora and fauna terms to be more likely to be widely borrowed than basic vocabulary, a pattern that echoes the overall trend that flora and fauna loan rates exceed basic vocabulary loan rates in these study areas, as reported in Bowern et al. (2014). However, the nuanced relationship between cultural importance, novelty, and ethnobiological term stability discussed in that study are also consistent with the finding that some flora and fauna terms are widely borrowed while others more closely resemble basic vocabulary in their borrowing patterns. That is, we find no simple association between material culture items and high-frequency loan status. Though we do find that material culture terms are borrowed more frequently than words from other domains, not all material culture words are highly loaned, and there are highly loaned items that are not part of the material culture domain. Our data sample does not permit a detailed study of indigenous items that are likely to have been recently introduced versus those of long standing, but we note the preponderance of acculturation terms in our high loan category, which is consistent with a claim that Wanderwörter are particularly associated with the rapid introduction of an item.

4.2. Technologies

The introduction and spread of technology creates a natural opportunity for the borrowing of terminology, as well as for repeated loans across an area. A classic example of this from our data sample is the terminology associated with Australian spearthrowers. Spearthrowers, often referred to as *atlatl* in the Americas, were widespread in pre-contact Australia, dramatically increasing the range and power of spears (cf. Davidson, 1936). Their representation in rock art in the Kimberley Region suggests they have been in use in parts of Australia for at least 3000–4000 years (Walsh and Morwood, 1999; Davidson, 1936, Akerman and McConvell, 2002). Different spearthrower styles were used in various places and time depths in Australia, with etyma representing specific types of spearthrowers, rather than the technology in general.

Though multiple spearthrower terms have been highly borrowed in Australia, the term %ngapale, used to describe light, lath-like spearthrowers found in the northern riverine zone, with a shaft made partly of reed or bamboo, shows a typical pattern. The form *ngapale- is found in early Jarragan or Proto-Jarragan, with reflexes in both Kajirrabeng and the South Jarragan languages (see example (9) (Fig. 8) below). From this source, it was borrowed into Bunuban (with a South Jarragan source, traceable due to a medial consonant lenition in South Jarragan), and into southern Pama–Nyungan languages (Western Ngumpin, Marrngu, and some Western Desert dialects) as *ngapaliny*. The southern Pama–Nyungan diffusion took place before the lenition sound change in Jarragan, since unlenited *p* is retained; and before the change of the feminine suffix *-ny* to *-ng* (in the Northern Jarragan languages) and *-l* in Kija. This provides a potential way of dating this early diffusion. The term was subsequently borrowed from Walmajarri into languages further west.

(9) %ngapale "spearthrower"
Kajirrabeng *ngapaleng,* Miriwung *ngawaleng,* Kija *ngawalel* > Bunuba *ngawalu,* Gooniyandi *ngawali*;
> Walmajarri *ngapaliny* > Karajarri, Nyikina *ngapaliny* > Nyulnyul *ngapaliny,* Yawuru *ngapalin*

Fig. 8. Spread of %ngapale 'spearthrower'.

In Miriwung, the term %ngapaleng (> *ngawaleng*) is polysemous, signifying either this particular type of spearthrower or the bat's wing coral tree (gray corkwood, *Erythrina vespertillio*), with the tree meaning being more salient. This tree was used to make the spearthrower in the Kimberley region (Kofod, 1978), as well as the light spearthrower of Worrorran speakers to the north-west of Jarragan. The same polysemy is found in Worrorran languages between the word for this tree and the word for this style of spear-thrower (*yamalba;* Capell, 1939: 400 citing Love, 1938). Source/product polysemy is common in Australian languages (see Dixon, 1980: 103) and can lead to semantic change. For instance, a tree species name can become an artifact name, either retaining or eventually losing its tree meaning (Dixon, 2002: 56).[14] In this case, the apparent loss of the original meaning assists in plotting the direction of the diffusion of the Wanderwort: where the original polysemy is attested (northern Jarragan) is most likely the origin of the word. The southward diffusion of the root %ngapale along the two aforementioned paths was associated with only the spearthrower meaning, not the tree species.

4.3. Economic and cultural innovations

Meanings associated with trade, economy, and cultural innovation are also prevalent in lists of Wanderwörter in all three case study areas. The natural correlation between economic systems, areal contact, and the diffusion of items associated with cultural change helps to explain the prevalence of economic and subsistence terms among the identified Wanderwörter. This category includes both items like 'string of shell money' in North America and domesticated species like maize and beans in South America. To illustrate this category, we look more closely at the latter. Maize and beans, two of the most important food crops in the Americas, were introduced to Amazonia before the arrival of Europeans.

All the flora Wanderwörter we identified in Amazonia are domesticated, including post-Conquest introductions and a few pre-Conquest items, such as maize and beans. Maize (*Zea mays*) was domesticated from local grasses around 3500 years ago in South-Eastern Mexico and spread into both North and South America over the next 2000 years. In the case of Uto-Aztecan this spread of maize cultivation may have been closely associated with spread of the languages (Hill, 2001). Beans (*Phaseolus lunatus* and *Phaseolus vulgaris*) were domesticated along the Peruvian coast of South America as early as 5600 years ago, with subsequent spread into the Andes and thence into the Amazon basin (Kaplan and Lynch, 1999; Kwak and Gepts, 2009). Maize is represented by several etyma in Amazonia, notably the multiply borrowed forms %bea (see Fig. 9) and %kana (see Fig. 10) in the northwest. A widespread term for 'beans', %kumana (see Fig. 11), probably originated in Tupi–Guarani, but was likely disseminated in part via Arawak languages, which were also a source of one 'maize' Wanderwort. Quechua appears to have been the source for the other widespread term for 'beans', %purutu (see Fig. 12); however, since regional Spanish also adopted a variant of this Wanderwort, it is possible that diffusion of some of the %purutu forms was mediated more directly by Spanish.[15]

(10) %bea 'maize'
Chocoan *pe <--> Tukanoan *we'a (Cubeo we'á, West Tukanoan *wea*, *bea*) > Nukak (Kakua-Nukak) *weá*, Witotoan *beja* > ? Muinane (Bora) *bɛ́dʒa*, Resigaro (Arawak) *veéká?ó*

(11) %kana 'maize'
Inland North Arawak *kaana (e.g. Piapoco *kanái*) > Puinave (isolate) *kãn*, Nukak (Kakua-Nukak) *káná*, Eñepa/Pemon (Carib) *keʔnaʔ*

(12) %kumana 'beans'
Tupi–Guarani *kumana > North Arawak (e.g. Baniwa *kumána*) > Wai Wai (Carib) *kumasa*, Puinave (isolate) *kumana*, ?Hodï (isolate) *ka'nawa*, East Tukanoan (Carapana *kũmãnã*, Makuna *kũmana*), Nadahup (Nadëb *kamaan*, Dâw *mấn*)

(13) %purutu 'beans' Quechua *purutu > Yagua (Peba-Yagua) *purutu*, Huaorani (isolate) *podoto*, Siona (West Tukanoan) *poroto*, Cocama (Tupi–Guarani) *purutu*, Witotoan (Ocaina *poróót^{y}o*, Murui *boroto*)

In the Americas, where agriculture, or at least plant cultivation, played some role in the subsistence of many societies, the spread of borrowed terms for domesticated species may well have accompanied the spread of agricultural cultivation. Where cultivation was practiced in the Americas, these items may have been moved by humans into new areas (as seeds, root-stock, etc.) or in some cases the idea of utilizing previously existing wild varieties as crops may have diffused, creating an opportunity for cultivar terminology to spread along with these crops. While more focused work on a case-by-case basis is needed to determine the extent to which this scenario has applied, it has been reasonably well established in particular regions (e.g. the partial adoption of agricultural technology by foragers in the northwest Amazon; Epps, forthcoming) and for particular cultivars (e.g. Brazil nut, *Bertholletia excelsa*; Shepard and Ramirez, 2011). Pre-contact animal domestication only occurred in restricted areas in the Americas and is not reflected in our sample; however, domesticated animals introduced by Europeans did give rise to borrowing events, including early post-Contact diffusion of Wanderwörter (see further Section 4.6).

[14] Such patterns are common in our dataset. For example *yirrikili* is a widespread generic term for boomerang in the Western Kimberley and Pilbara; it is also a common word for *Hakea arborescens*, the tree from which boomerangs are very commonly made.

[15] For further discussion and reconstructions, see Brown et al. (2014a,b), Chacon (2013), Mello (2000) and Ramirez (2001).

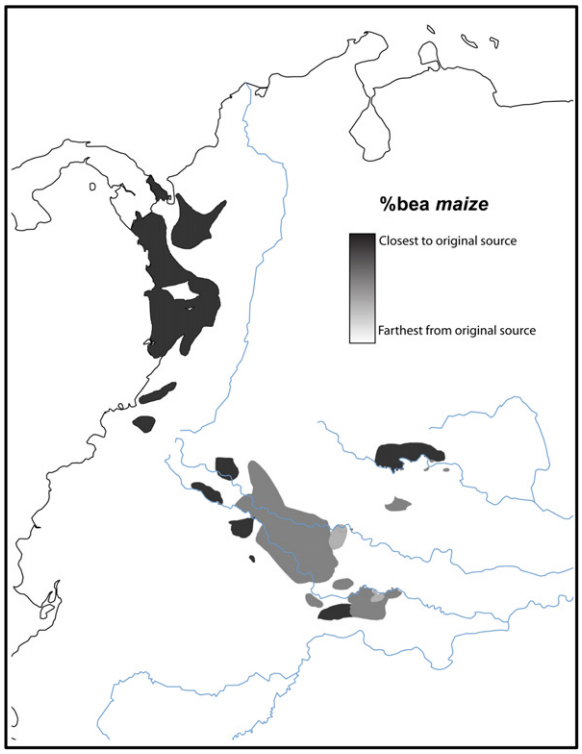

Fig. 9. Languages showing reflexes of %bea 'maize'.

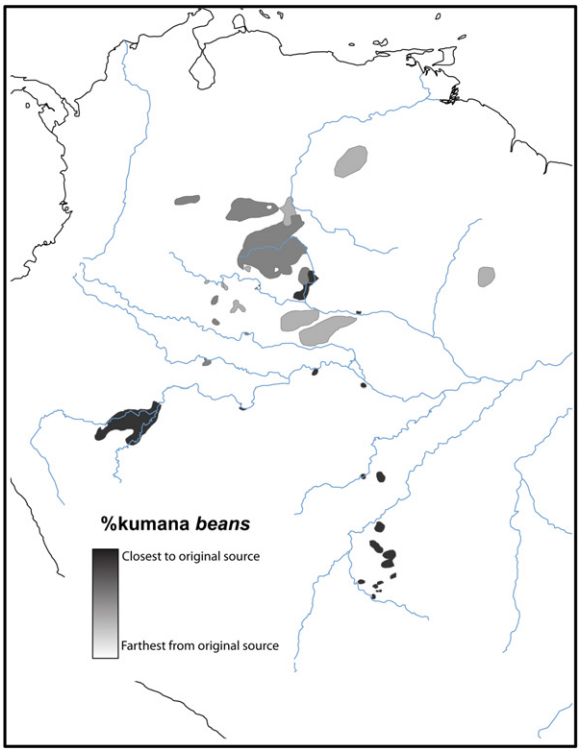

Fig. 11. Languages showing reflexes of %kumana 'beans'.

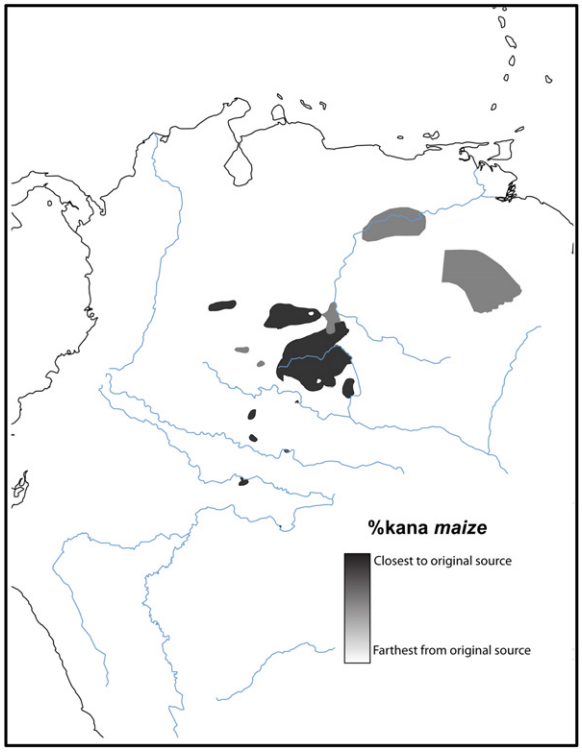

Fig. 10. Languages showing reflexes of %kana 'maize'.

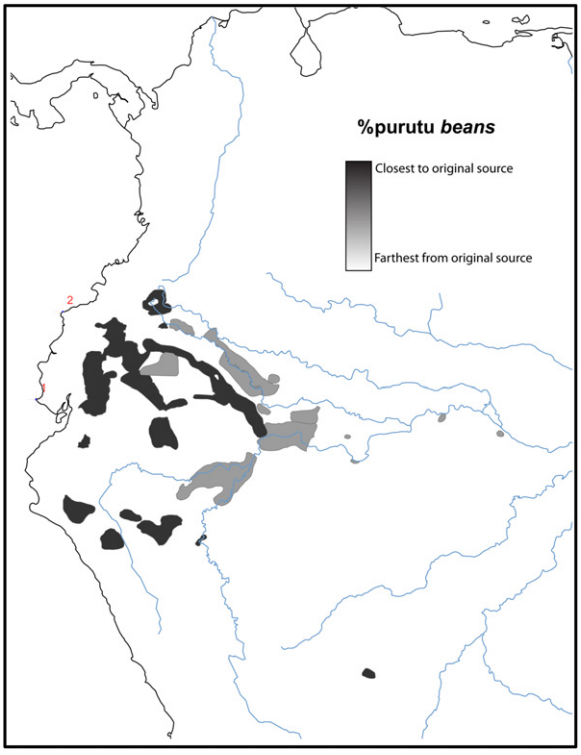

Fig. 12. Languages showing reflexes of %purutu 'beans'.

4.4. Ritual and spiritual associations

This category includes both items associated with ritual use and those with more abstract links to spiritual beliefs. Wanderwörter of this type appear to have accompanied the spread of ritual and mythological complexes throughout the study regions, however the exact paths of many of these spiritual elements are unclear. Examples of this are 'pearlshell', a decorative item in Australia, and 'Datura', a psychotropic substance in North America; see also the example of "coca" (*Erythroxylum coca*) in South America, mentioned above.

Shells are trade items in many areas of the world, often valued for their beauty and for use as ritual objects and decorations. In Australia the pearlshell (*Pinctada maxima*) is used this way

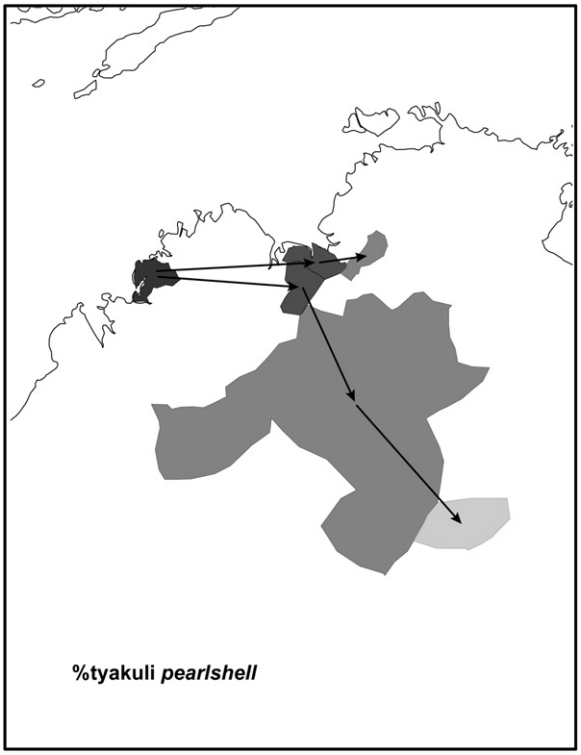

Fig. 13. Languages showing %tyakuli 'pearlshell'.

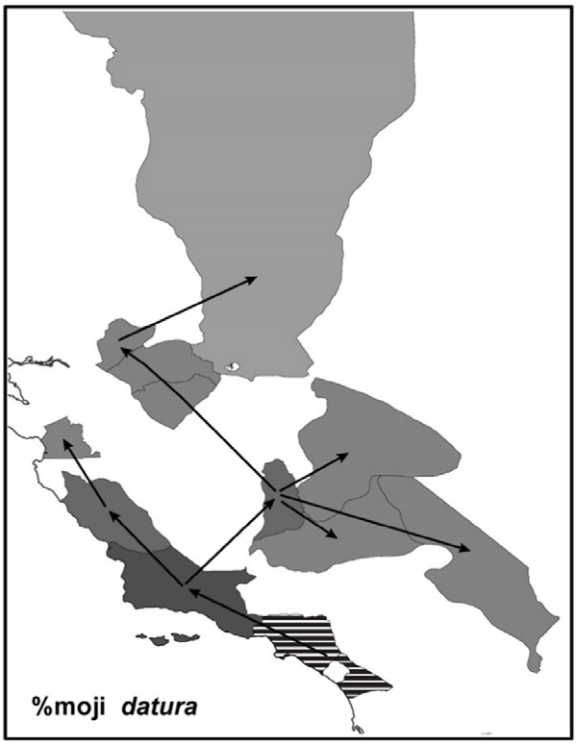

Fig. 14. Languages showing %moji 'datura'.

(Akerman and Stanton, 1994)—as a pendant and pubic covering for men and boys in initiation ceremonies over a wide area of northern Australia and beyond. The mother-of-pearl is also often carved to create objects of value. The source of these shells is on the Kimberley coast from where they were traded as far as the South Australian Bight and Gulf of Carpentaria on the other side of the continent.

One of the terms for this shell in a number of languages is %tyakuli 'pearl shell' (see Fig. 13).[16] The origin of the term appears to be *tyakoli* in Worrorra (or a closely related language), the coastal language spoken in one of the regions where the shells were collected. The path of borrowing can be traced from Worrorran into Jarragan languages, and thence further east into the non-Pama–Nyungan language Jaminjung and to the Ngumpin–Yapa subgroup of Pama–Nyungan, then into Anmatyerr, an Arandic language to the south (Green, 2009: 526).

(14) %tyakuli 'pearlshell'
Worrorra *tyakoli* > Gajirrabeng, Miriwung *tyakuli-ng* > Jaminjung; Ngumpin–Yapa *tyakuli, tyakurli* > Anmatyerr *tyakwerl*

The fact that the word has entered the southern Jarragan and Ngumpin languages without lenition of the /k/ (to /w/) indicates that this is a recent loan. We can surmise therefore that the diffusion of the pearl-shell and this Wanderwort occurred after the spread of the Wanderwort %ngapale- 'light wood spear-thrower' discussed in Section 4.2 above, which does show lenition. The absence of initial consonant-dropping in Anmatyerr also marks this word as a recent loan into this language. Akerman and Stanton (1994), based on historical sources, give a date in the later nineteenth century for the diffusion of pearl-shell through the Victoria River District and beyond. This is consistent with this linguistic evidence and a correlated spread of the item and the form used to denote it. This also points to a rapid spread and rapid incorporation of this new element into ritual. Such rapid spread may be particularly characteristic of cultural innovations linked to ritual since cults spread quickly (McCarthy, 1939: 83–86).

The datura cult in California is another example of this type of correlated cultural and lexical diffusion. Datura, also known as 'toloache' or 'western jimsonweed' (see Fig. 14), is a genus of plants found widely in southern and central California and parts of the Great Basin that has potent hallucinogenic properties and is extremely toxic at high doses. Decoctions of this plant, particularly its roots, are traditionally administered to groups of initiates in southern California and to individuals in central California to induce a trance state and connect the user to the spirit realm. The southern datura cult uses the plant primarily in initiation rites, while individuals use it farther north to ward off malicious spirits, garner luck, or initiate personal spiritual experiences (Gayton, 1948; Applegate, 1975). Though the wide natural range of this species makes it difficult to pinpoint an origin for the use of this plant, the chain of linguistic borrowing associated with it places its probable linguistic origin in the Takic languages of Southern California.

(15) %moji- ∼ %moni- 'Datura (*Datura wrightii)*'
Pre-Gabrielino or Luiseño *mooji-ly, mooni-ly* 'moon' > Chumashan *mom'oj* > Antoniano Salinan *moi'*, Migueleño Salinan *mo:noí'jI* > Mutsun *mo'-noi;* Migueleño Salinan *mo:noí'jI* > [Yokutsan?*][17] > Central and Southern Sierra Miwok *mo:nuj-*; Chumashan *mom'oj* > Tübatulabal *mo:'mo:ht* >

[16] Pearlshells from Nyulnyulan language areas were also traded, but the Nyulnyulan term is %riityi, another Wanderwort with a Western/Southern diffusion route, shown as a zone on the Australian trade route map in Fig. 5.

[17] We suggest a possible Yokutsan intermediary between Salinan and Sierra Miwok. However, the word for "Datura" in Yokuts varieties recorded by C.H. Merriam is universally %ta:nai (related to a verb for "to be drunk"). The connection to Sierra Miwok of Salinan may be direct trade, or it may be that the form once appeared in Plains Miwok, another possible intermediary language.

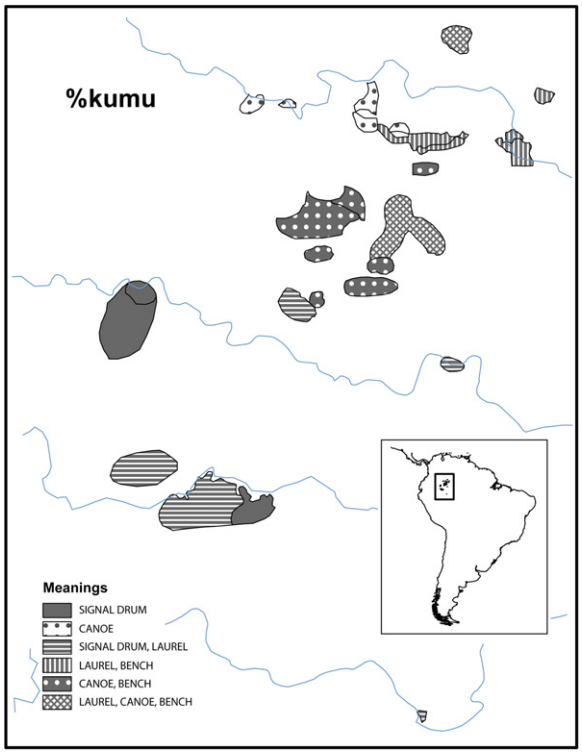

Fig. 15. Languages showing %kumu 'drum'.

Tümpisa Shoshone, Big Smokey Valley Shoshone *mui-ppeh*, Kawaiisu *moo-pɨ*, Northern Sierra Miwok *moo-tah* > Northern Paiute *moohoo'oo* "opium"

Takic languages have two variants of a word for 'moon'. The expected regular form reflects Proto-Northern Uto-Aztecan *mɨji-la. However, Cupeño has both *mɨji-ly* 'month' and *mɨni-ly* 'moon'. Cahuilla has meni-ly 'moon'. The Salinan forms suggest that this variation may be quite old (a similar /y/ ∼ /n/ alternation appears in Takic **kwija-* ∼ **kwini-* 'Black Oak, *Quercus kelloggii*'), and the Mutsun and Miwokan items appear to have the Migueleño Salinan word, and ultimately a Takic form with /n/, as a source. An obvious question is whether a semantic change from Takic 'moon' to 'datura', a hallucinogenic plant, in the borrowing languages can be justified. In this case, the association is clear; Applegate (1975) has clearly shown the association between the moon and the plant in the Chumash datura cult, and the association is widely documented in the southern California languages.[18]

From South America, a particularly interesting example of a Wanderwort associated with cultural and ritual practice involves a set of items with strong cultural significance in the northwest Amazon, all of which are assigned to the etymon %kumu (see Fig. 15), with different patterns of polysemy in different languages. This Wanderwort is found among languages of the East Tukanoan family (Vaupés region) and of the area to the southwest occupied by the 'People of the Center' (speakers of Bora, Witoto, Arawak, and other languages); these regions share a number of other linguistic and cultural features that indicate a history of contact. Variants of the %kumu etymon mean 'signal drum' (a large drum made from a whole section of tree trunk) for Bora and Arawak speakers, while in Tukanoan languages %kumu exhibits polysemy among the meanings 'canoe',[19] 'bench', and 'healer/shaman' (for whom the traditional seat is the carved, painted Tukanoan bench).[20] Notably similar terms also occur in both regions with the meaning 'laurel tree' (fam. *Lauraceae*), which is a standard material from which signal drums and canoes are made. Unfortunately, comparative data are at this point too scanty to work out the full story of how this Wanderwort spread.

(16) %kumu 'signal drum', 'laurel tree (fam. *Lauraceae*)', 'canoe', 'bench', 'healer/shaman'
'signal drum': Bora (Bora *k^{h}uúmu*, Muinane *kɨ́ɨ́mɨ-ba*), Arawak (Resigaro *koómó*, Yucuna *kumu*)
'laurel tree (fam. *Lauraceae*)': East Tukanoan (Makuna *kũma,* Tukano *komâ-kɨ*), Arawak (Yucuna *kumujlé*), Bora (Bora *k^{h}uumúru-he*)
'canoe': East Tukanoan (Barasano *kũbu-ã*, Carapana *kũbũ-ã*, Macuna *kũma*, Yuruti *kũũbũ-ã*, Siriano *kũmá*, Tanimuca *kũbũ-ã*, Waimaja *k^{h}úmũ-ã*
'bench': East Tukanoan (Makuna *kũmu-rõ*, Tukano *kumu*, Tanimuca *kũbũ-ã*, Bará *kũbũ-ro*, Waimaja *k^{h}ũmũ-rõ̀*)
'healer, shaman': East Tukanoan (Barasano *kũbũ*, Carapana *kũbũ*, Desano *kũmu*, Makuna *kũmu*, Yuruti *kũũbũ*, Tukano *kumu*)

Thus in summary, words denoting items or plants involved in ritual are well attested in our dataset.

4.5. Acculturation terms

Widespread lexical items may reflect repeated instances of borrowing from a spreading language. Examples can be found in loans from colonial languages. For instance, in the North American sample, nearly all languages have a loan from Spanish *caballo* for 'horse'. However, in no case have we been able to demonstrate that the loan was more than two borrowing steps away from Spanish itself, and in most cases the form of the loan suggests a borrowing directly from Spanish, as with Maidu *kawáju* 'horse', which is very close to the Spanish form even though Maidu, a language of the Sierra Nevada highlands in northeastern California, was spoken at a considerable distance from any early settlement of Spanish speakers.

In contrast, in the Australian sample, words for 'horse' are not usually from English (the contact language of the colonial period), even though the terms are widespread. Rather, terms such as %timana, %yarraman, %nantu and %yawarta are in origin terms in Australian languages. %nantu, for example, is the Kaurna (Adelaide area) word for 'ghost', while %yawarta is a species of kangaroo in Nyungar (Walsh, 1992).

[18] Klar (1977) considers the Chumashan form, with variants found in all Chumashan languages, to be Proto-Chumashan. However, by chance all of the sounds in the word that Klar (1977) reconstructs as Proto-Chumashan *mom'oj (a reduplication of *moj) have been stable in the history of Chumashan, so we cannot distinguish in this case a genuine Proto-Chumashan form from a word that has spread by borrowing. Therefore this reconstruction is not definitive. However, the source of the loan probably pre-dates the loss of intervocalic /j/ in Gabrielino (the most likely source language, given its close geographic and cultural association with Chumash); the historically-attested form in Gabrielino is /mwa:r/ from Pre-Gabrielino *moja-la. The absence of the reduplication in Salinan suggests that the reduplication may be a relatively recent innovation in Chumashan. The Western Shoshone word with the root *mui-* has sometimes been suggested to come from words for "crazy". However, the Numic words are not cognate with one another and it is likely that the Shoshone word comes from Tübatulabal, possibly with some phonological convergence with words for "crazy" given the well-known hallucinogenic effects of consuming infusions of the plant.

[19] While polysemous uses of the %kumu etymon do not appear to include both "signal drum" and "canoe" in any of the languages concerned, the distinct etymon *jɨkɨ does share the meanings "canoe" and "signal drum" across the East Tukanoan family; the presence of an apparently cognate form meaning "canoe" in West Tukanoan suggests that the "canoe" meaning was prior (but cf. Chacon, 2013).

[20] An association between benches and canoes among Tukanoan peoples may derive from a belief that shamanic activities recreate the voyage of the ancestral canoe, a central theme of Tukanoan mythology.

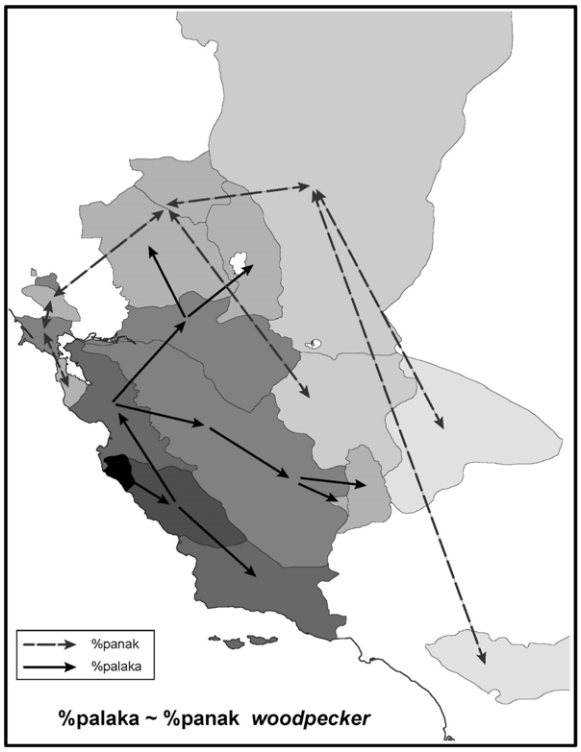

Fig. 16. Wanderwort patterns for %palaka ∼ %panak 'woodpecker'.

Acculturation terms such as 'horse' show up in our loan count data as extremely highly borrowed terms, borrowed so frequently, in fact, that they are assigned their own category by data partitioning algorithms. Whether the type of widespread loan patterns associated with colonialism and acculturation is to be considered a sub-type of Wanderwörter or an entirely different phenomenon depends on definitional criteria. As noted above in the case of Spanish 'horse' in North America, the widespread presence of colonial languages often makes it particularly difficult to distinguish between multiple independent borrowing events involving the colonial source language and various recipient languages, versus chain- or network-like sets of borrowing events by which a word traveled through multiple languages.

4.6. Wanderwörter less clearly linked to cultural diffusion

The majority of the terms identified as Wanderwörter in our three case study areas can be linked to the diffusion of cultural items and practices through the types of associations illustrated above. However, a small number of Wanderwörter are found which are not of exceptional economic importance, nor are they obviously related to ritual or other cultural significance in the recent period. Examples include a generic term for 'fish' in North America and %buthuru, a highly borrowed term for 'ear' in Australia. One hypothesis is that these items were associated with diffusions of cultural patterns in the distant past but evidence of these routes has become hard to gather or interpret. Particularly in the case of ritual or mythological associations, the pathways of cultural diffusion may be difficult to trace at deep historical distances. The Australian term is a recent loan from English 'bottle' and so may have been associated with necronym taboo replacement.

This type of Wanderwort, less securely linked to cultural diffusion, is particularly common in the domain of flora and fauna. Such Wanderwörter are not likely to be associated with movement of the items named into new areas, as suggested for trade, cultivar, and ritual items above, since the species involved are widespread and stable. However, it is possible that some of these Wanderwörter are associated with very early spread of species or species use.

An example of a Wanderwort displaying this sort of unclear link to cultural diffusion can be seen in the terms for 'iguana' in northwestern Amazonia (probably themselves related), which have been widely borrowed among languages of the region (as well as into Spanish, probably from Arawak, and thence from Spanish to English):

(17) %jiwana ∼ %wajamaka ∼ %maɲaʔo 'iguana (*Iguana sp.*)'
Carib (Eñepa *jawana*, Carijona *iwana*, Wai Wai *kwana*, Yabarana *ju'wana*) > Yavitero (Arawak) *iwána*, Yanomami (Yanomama) *iwawa sikɨ* (*iwa* = caiman), Hodï (isolate) *uana*, Cofan (isolate) *iβana*, Aguaruna (Jivaroan) *iwán*;
(probably Carib) > Achagua/Piapoco (Arawak) *ʧamánali* [*ʧamána* = caiman]) > Makiritari (Carib) *jama:nadi*, Puinave (isolate?) *namãnã*; Kakua *mâɲaʔ*, Yucuna *maɲao*, Ocaina *mááɲaʔo*, Bora *mááɲaʔo*, Resigaro *maaɲáʔo*;
Carib (Akawaio *wajamaga*, Pemon *waʌamaka*, Yukpa *ajamaka*) > Nadeb *wajãam*

While the iguana's size and importance as a food source (as well as its resemblance to the much larger caiman) bespeak its cultural significance, it is not clear why this term in particular would have been so frequently borrowed while other terms for salient animals were more stable. We also note the potential for circularity in observing that Wanderwort status may be both attributable to and indicative of cultural importance.

In other cases, while it may be possible to establish the cultural importance of a term, its status as a Wanderwort may itself be in question. An example of this problem can be seen in the North American term for 'acorn woodpecker' (see Fig. 16). Woodpecker scalps were traded for use in dance costumes in several California and Great Basin societies. However, the words used to name this species could be similar due to onomatopoeia, which compromise the certainty of the borrowing chain and its link to the ritual/cultural importance of this species. The chain is given in (18).

(18) %palaka ∼ %pana(k) 'Acorn Woodpecker (*Melanerpes formicivorus*)':
Esselen *palatsa* "acorn" > Antoniano Salinan *palá:k:a7*, Migueleño Salinan *palá:k:ak* > Chumashan **pVlak'a(k')*, Costanoan **para:tak* > Miwokan **palaT:a-*, Yokuts (western varieties) **phala:tath* > Yokuts (eastern varieties: Palewyami *tal-la-kuk*, Yowlumne *palakak)* > Bankalachi *pă-lă'-tuk*, Western Mono Western Mono *panaatada*, Tübatulabal *ta:la'gakt;* Northern Sierra Miwok *palat:ata-* > Washo *balátdaday?)*

A second chain, almost certainly related to the first, but with directionality unclear, includes forms with medial /n/:

(19) Western Miwok %panak (Bodega Miwok *pan-nak*, Lake Miwok *panáak)* > San Francisco Costanoan *pen-nock*, Clear Lake Wappo *panak* > Maiduan **panak* > Northern Paiute *atza banna* > Big Smokey Valley Shoshone *unsa banna*

These borrowing chains have recently been discussed by Troike (2009).[21] Troike suggests an ultimate origin of these forms in Esselen 'acorn', since these birds drill holes in trees and buildings and tuck acorns into them. However, Esselen is not usually a donor language, and the influence of sound symbolism in this lexical complex must be considered. These words are surely in part sound-imitative, referring to the distinctive tapping of the bird; the resemblance to the Esselen word for 'acorn' may be a coincidence. Similar forms are found in distant languages, such as *pahpakana* 'pileated woodpecker' in Tunica, a language of Mississippi. However, it is highly unlikely that the California forms are all indepen-

[21] The forms from San Francisco Costanoan and Clear Lake Wappo are from that work.

dent inventions, and Troike (2009) makes an excellent case that the spread of the forms accompanied trade in woodpecker scalps, which were used in dance costumes.

Thus in summary, the position that Wanderwörter spreads are purely random phenomena consisting of local and insignificant borrowings which happen to link up into wide networks does not seem convincing, even in the case of plant and animal terms which cannot be securely linked to cultural innovation or diffusion. We show that Wanderwörter are mostly linked specifically to the diffusion of new items into an area, though these ideas may be associated with cultivation, ritual, or new technology.

5. Further discussion: other sources of widespread etyma

In summary, the systematic exploration of Wanderwörter in languages of Australia, North America, and South America presented here provides crucial evidence for understanding how and why these widespread loans differ from other, less frequently loaned lexical items. We have discovered that Wanderwörter are a subset of loanwords that are less common but far more frequently and widely loaned than 'ordinary' lexical items. By demonstrating that cultural terms are more likely than basic vocabulary items to become Wanderwörter we have provided evidence for the link between Wanderwörter and culture, and a detailed investigation of individual Wanderwörter in these three study areas links the majority of known Wanderwörter conclusively to meaning categories associated with cultural diffusion.

5.1. Ancient genetic unity

Ancient genetic unity, which remains questionable and difficult to explore for many parts of our language sample, is a potential source of some of the lexical complexes that appear to have traveled as loans. In Australia, it is possible that some widespread terms may be proto-Pama–Nyungan retentions rather than long-distance borrowings.[22] This is also possible (in theory) for non-Pama–Nyungan languages, although the examples we have found of shared etyma in non-Pama–Nyungan languages have not undergone the sound change we would expect at such great time depths, and so can be safely interpreted as borrowings. Between Pama–Nyungan and non-Pama–Nyungan languages there is a great deal of borrowing, including Wanderwörter, but a putative proto-Australian common ancestor is supported by so little agreed-upon content that it is implausible that any of the Australian Wanderwörter identified in this study could be common inheritances from that source.

Ancient genetic relationships are similarly unproven in North America, and though we must consider this as a possible source of North American lexical complexes, the lack of basic vocabulary which exhibit wide distributions contrasts with such a hypothesis. An example of a potential retention from an ancient ancestor in the North American sample is seen in the pair of words for big-game animals in (20).

(20) %mu-X 'Big-Horn Sheep':
Proto-Yuman *?-*muw* 'bighorn sheep' (Mixco 1978:80, 91) Cocopa *mu łyayák*; Iipay 'Aa *?emuu;* Yavapai *?mú*, Mojave, Yuma *?amó* 'mountain sheep, part of constellation Orion', Kiliwa *?+muw* 'mountain sheep, Orion's sword'; Seri/Comcaac *mojet,* Salinan *moi* 'bighorn' (Mason)

%mu-*Y* : 'Pronghorn Antelope': Cocopa *m?u·ł*, Yavapai *m?ūl*, Comcaac *haamoja* 'antelope', Salinan *múi',* Palewyami Yokuts *mo'-ket'*, Tulamni, Hometwoli Yokuts *muxotani* (Kroeber 1961:200); Wappo *moo'-oo*

The Yuman languages, Salinan, and Seri/Comcaac are divided from one another by Uto-Aztecan and Chumashan languages that do not exhibit any similar item for big-game ungulates. It is, of course, possible that this is an old loan, exchanged before the expansion of Chumashan and Uto-Aztecan into their present locations. The other possibility is that this is a vocabulary item inherited from a common ancestor of Salinan, Yuman, and Seri/Comcaac. Yuman, Salinan, and Seri/Comcaac have all been regarded as candidates for a membership in a Hokan genetic unit. Most Americanist linguists consider proposals for a Hokan family of languages to be unproven and perhaps unprovable. However, not only are the words for 'bighorn sheep' and 'antelope' similar across these languages, but two Yuman languages (in different sub-branches), Salinan, and Seri/Comcaac all have similar words for both 'Bighorn sheep' and 'antelope', suggesting the possibility of some kind of ancient derivational relationship between names for these two animals.[23] The animals are quite different (although both are important game animals), so this is a possible "shared anomaly" that may represent an ancestral 'Hokan' process. The 'antelope' form appears to have been loaned into Yokutsan and Wappo, neither of which has ever been suggested as a 'Hokan' language. Note that no similar form is attested in the so-called 'Hokan isolates' of northern California: Pomoan, Shastan, Yana, and Washo.

A further way in which languages in an area may come to share forms, but without a process of widespread borrowing, is if a word is borrowed from one ancestor language into another and the languages subsequently diversify. For example, a number of Nyulnyulan and Pama–Nyungan languages share reflexes of the form *mara 'hand'; rather than being either a widespread loan or an ancient retention from Proto-Australia, however, the form was most likely borrowed from a precursor of one of the modern Ngumpin–Yapa languages into Proto-Nyulnyulan, as evidence by the shared reflex *–marla* (the sound change of *r* > *rl* is regular in Ngumpin–Yapa; see McConvell and Laughren, 2004). We have excluded such forms from our counts where we have the evidence to do so (for example, where a lexical item follows regular sound correspondences between related languages which suggests that it is an inheritance rather than widespread loan).

5.2. Substratal elements

Another possibility that must be considered in the case of a geographically widespread lexical complex is the presence of a substratum language from which words have been borrowed.[24] Such languages may be ancient and unattested, compounding the problem of identifying them as sources. The option of analyzing apparent Wanderwort-like networks as manifestations of substrates is more or less confined to cases where we can independently find evidence of a substrate and where there are attested languages closely related to the substrate language to bear witness.

5.3. Sound symbolism

Widespread lexical items may reflect independent inventions of rather similar lexical items, motivated by iconicity (as in the

[22] However, this possibility is limited in our case study area because of the number of languages from non-Pama–Nyungan families. Ancient retentions are likely to form only a very small proportion of our sample, but might be a possibility for some of the items which are widespread in Pama–Nyungan but only in a few, adjacent non-Pama–Nyungan languages. They would therefore be regular loans into the non-Pama–Nyungan languages, not Wanderwörter.

[23] The abstract suffixes -X and -Y in the labels for the lexical complexes above represent this proposal.

[24] In this paper we are using 'substratum' to mean that language A which existed in an area prior to language shift to language B, and which provided elements to a language B+, changed from B by contact. There are no assumptions or implications that the substratal language A was socially subordinate to B (as in some definitions of the term).

case of sound symbolism and ideophones). For instance, bird names are likely sites for sound-imitative formations that may be quite similar cross-linguistically because the designated bird has a distinctive cry. Hunn (1975) has discussed this possibility for names for owls in the Americas. However, sound imitative roots are sometimes deformed by regular sound changes, and so cannot be repeated independent inventions. They may be inherited or re-borrowed into other languages in the modified form following sound change. The potential for sound symbolism to obscure or lend uncertainty to the diagnosis of Wanderwort status is discussed above in Section 4.6 in relation to North American acorn woodpecker terms.

6. Conclusions

Wanderwörter have traveled between languages and peoples not only in the wake of imperial expansion but also between the smaller languages and societies of the world, giving voice to new ideas and names to new products and practices. The limited study of Wanderwörter to date has focused on agricultural or industrialized societies; however, as we show here, the phenomenon is well attested in networks of smaller languages, including those of hunter-gatherers.

There is evidence that agriculture plays a role in the patterning of Wanderwörter, since words for cultivated crops are often widespread, even in regions like Amazonia where general borrowing is very low. Words for wild plants, in contrast, rarely travel as Wanderwörter, unless they are also artifact terms. Nevertheless, our exploration of the cultural, pragmatic, and lexical semantic facets of Wanderwort spread demonstrate that specific categories of cultural association, including but not limited to agricultural cultivation, seem to condition widespread borrowing. We find Wanderwörter not only in agricultural and industrial societies, but also in situations of contact among exclusively non-agricultural groups that predate colonial influences.

Trade in a broad sense is not confined to commercial markets but has played a significant role in all the small and forager societies we have looked at. Some prized items were exchanged along long chains and frequently this also involved the passing on of words for the items, whether these involved new technologies, ritual paraphernalia or drugs. However, Bowern et al. (2014) suggest that trade status alone is not enough to elevate the loan likelihood of lexical items, and we find that although certain traded items appear to spread along networks associated with trade pathways, the overall association between Wanderwörter networks and trade networks is inconsistent.

While Wanderwörter continue to be a difficult linguistic phenomenon to describe and analyze, the results of this study point us toward a clearer notion of what these items are and why they are borrowed so widely. Our definition of Wanderwort might be edited in light of these findings to reflect the conclusion that Wanderwörter are essentially outliers in the realm of loanwords, borrowed far more frequently than typical lexical items but still a subset of this more general phenomenon. They are traditionally defined as any widely borrowed items that diffuse through areal or chain-like networks. However, we note that this diffusion is typically made possible by the spread of cultural items, customs, or ideas, and suggest that the link between Wanderwörter and cultural diffusion may be a more sound basis for defining this term than the traditional definitions that rely on specific claims about the loan frequency, areality, or untraceability of these terms.

Appendix A. Supplementary material

Supplementary material related to this article can be found online at http://dx.doi.org/10.1016/j.amper.2014.10.001.

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